

WHAT IS CLAIMED IS:

1. A photovoltaic device comprising:

a photovoltaic element including a transparent
5 conductive oxide film having arithmetic mean deviation of
the profile of not more than about 2 nm and a paste
electrode, formed on said transparent conductive oxide
film, containing at least a metal material and a resin
material, said resin material containing at least about 60
10 percent by weight and not more than about 100 percent by
weight of epoxy resin.

2. The photovoltaic device according to claim 1,
wherein

15 said photovoltaic element includes a first
conductivity type crystalline semiconductor layer and a
substantially intrinsic non-single-crystalline
semiconductor layer formed on said crystalline
semiconductor layer, and

20 said transparent conductive oxide film is formed on
said non-single-crystalline semiconductor layer.

3. The photovoltaic device according to claim 2,
wherein

25 said photovoltaic element includes a second

conductivity type non-single-crystalline semiconductor layer formed on said substantially intrinsic non-single-crystalline semiconductor layer, and

5 said transparent conductive oxide film is formed on said second conductivity type non-single-crystalline semiconductor layer.

4. The photovoltaic device according to claim 2, wherein

10 said substantially intrinsic non-single-crystalline semiconductor layer includes a substantially intrinsic first non-single-crystalline semiconductor layer formed on the upper surface of said first conductivity type crystalline semiconductor layer and a substantially
15 intrinsic second non-single-crystalline semiconductor layer formed on the lower surface of said first conductivity type crystalline semiconductor layer,

 said photovoltaic element includes a second conductivity type third non-single-crystalline
20 semiconductor layer formed on the upper surface of said first non-single-crystalline semiconductor layer and a first conductivity type fourth non-single-crystalline semiconductor layer formed on the lower surface of said second non-single-crystalline semiconductor layer, and

25 said transparent conductive oxide film includes a

first transparent conductive oxide film formed on the upper surface of said third non-single-crystalline semiconductor layer and a second transparent conductive oxide film formed on the lower surface of said fourth non-
5 single-crystalline semiconductor layer.

5. The photovoltaic device according to claim 1,
wherein

said resin material constituting said paste electrode
10 contains at least about 75 percent by weight and not more than about 100 percent by weight of said epoxy resin.

6. The photovoltaic device according to claim 1,
wherein

15 said transparent conductive oxide film has arithmetic mean deviation of the profile of at least about 0.5 nm and not more than about 1 nm.

7. The photovoltaic device according to claim 1,
20 wherein

said transparent conductive oxide film contains SnO₂-added In₂O₃.

8. The photovoltaic device according to claim 7,
25 wherein

the content of Sn in said transparent conductive oxide film is not more than about 5 percent by weight.

9. The photovoltaic device according to claim 1,
5 wherein

said resin material constituting said paste electrode contains urethane resin in addition to said epoxy resin.

10. The photovoltaic device according to claim 1,
10 wherein

said metal material constituting said paste electrode is Ag.

11. The photovoltaic device according to claim 1,
15 wherein

the contact angle of water with respect to the surface of said transparent conductive oxide film is at least about 40° and not more than about 74°.

20 12. The photovoltaic device according to claim 1, wherein

a plurality of said photovoltaic elements are provided at a prescribed interval, and

said paste electrode includes a first paste electrode
25 formed on the upper surface of each said photovoltaic

element and a second paste electrode formed on the lower surface of each said photovoltaic element,

said photovoltaic device further comprising an electric wire having a first end connected to said first
5 paste electrode formed on the upper surface of prescribed said photovoltaic element and a second end connected to said second paste electrode formed on the lower surface of another said photovoltaic element adjacent to said prescribed photovoltaic element.

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13. A photovoltaic device comprising:

a photovoltaic element including a transparent
conductive oxide film provided with a surface having a
contact angle of at least about 40° and not more than about
15 74° with respect to water and a paste electrode, formed on said transparent conductive oxide film, containing at least a metal material and a resin material, said resin material containing at least about 60 percent by weight and not more than about 100 percent by weight of epoxy
20 resin.

14. The photovoltaic device according to claim 13,
wherein

said photovoltaic element includes a first
25 conductivity type crystalline semiconductor layer and a

substantially intrinsic non-single-crystalline
semiconductor layer formed on said crystalline
semiconductor layer, and

said transparent conductive oxide film is formed on
5 said non-single-crystalline semiconductor layer.

15. The photovoltaic device according to claim 14,
wherein

said photovoltaic element includes a second
10 conductivity type non-single-crystalline semiconductor
layer formed on said substantially intrinsic non-single-
crystalline semiconductor layer, and

said transparent conductive oxide film is formed on
said second conductivity type non-single-crystalline
15 semiconductor layer.

16. The photovoltaic device according to claim 14,
wherein

said substantially intrinsic non-single-crystalline
20 semiconductor layer includes a substantially intrinsic
first non-single-crystalline semiconductor layer formed on
the upper surface of said first conductivity type
crystalline semiconductor layer and a substantially
intrinsic second non-single-crystalline semiconductor
25 layer formed on the lower surface of said first

conductivity type crystalline semiconductor layer,

said photovoltaic element includes a second
conductivity type third non-single-crystalline
semiconductor layer formed on the upper surface of said
5 first non-single-crystalline semiconductor layer and a
first conductivity type fourth non-single-crystalline
semiconductor layer formed on the lower surface of said
second non-single-crystalline semiconductor layer, and

said transparent conductive oxide film includes a
10 first transparent conductive oxide film formed on the
upper surface of said third non-single-crystalline
semiconductor layer and a second transparent conductive
oxide film formed on the lower surface of said fourth non-
single-crystalline semiconductor layer.

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17. The photovoltaic device according to claim 13,
wherein

said resin material constituting said paste electrode
contains at least about 75 percent by weight and not more
20 than about 100 percent by weight of said epoxy resin.

18. The photovoltaic device according to claim 13,
wherein

said transparent conductive oxide film contains SnO₂-
25 added In₂O₃.

19. The photovoltaic device according to claim 18,
wherein

the content of Sn in said transparent conductive
5 oxide film is not more than about 5 percent by weight.

20. The photovoltaic device according to claim 13,
wherein

said resin material constituting said paste electrode
10 contains urethane resin in addition to said epoxy resin.

21. The photovoltaic device according to claim 13,
wherein

said metal material constituting said paste electrode
15 is Ag.

22. The photovoltaic device according to claim 13,
wherein

a plurality of said photovoltaic elements are
20 provided at a prescribed interval, and

said paste electrode includes a first paste electrode
formed on the upper surface of each said photovoltaic
element and a second paste electrode formed on the lower
surface of each said photovoltaic element,

25 said photovoltaic device further comprising an

electric wire having a first end connected to said first
paste electrode formed on the upper surface of prescribed
said photovoltaic element and a second end connected to
said second paste electrode formed on the lower surface of
5 another said photovoltaic element adjacent to said
prescribed photovoltaic element.